THE ZOOLOGIST

No. 733.—July, 1902.

AVICULTURAL EXPERIENCES DURING ABOUT TWENTY YEARS' STUDY OF BIRDS IN CAPTIVITY.

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It is now about thirty-one years since I first commenced the study of living birds, and about twenty years since I first began to keep them in cage and aviary. During the whole of that time I have striven to make this labour of love useful to ornithologists generally; not only by carefully noting the behaviour of the various species which I have possessed—their postures when courting, their songs, their changes of plumage, and the manner in which those changes were effected, the colouring of their soft parts, their sexual differences, their method of nesting, and the character of their eggs—but I have, I think, conclusively proved that birds, although they undoubtedly are guided by instinct (by which term I understand inherited impressions upon the brain), are nevertheless capable of reasoning, and altering their inherited habit to suit a changed environment. I have also found that a bird, when hand-reared, and constantly in the company of human beings, develops a higher order of intelligence, and consequently is capable of a keener enjoyment of life, than if permitted to grow up a savage.

The postures, bowings, and dances of birds when courting are generally exceedingly comical, and, if birds regarded them from a human standpoint, they would be better calculated to inspire a feeling of scorn than of admiration in the minds of their mates; though in some cases, where brilliant colouring is thereby exposed to the feminine eye, admiration might modify the contemptuous feeling.

Among the Thrushes, the cock birds usually approach the hens with outstretched neck, drooping wings, and tail jerked upright. After pairing the cock bird stands straight up, with tail depressed, neck stretched, and bill in a line with the neck, and utters a screaming whistle. I have noticed this in the case both of the American Blue-bird (*Sialia sialis*) and the common Blackbird, the latter being a wild bird, which used to approach its hen upon the roof of my outdoor aviary, which runs parallel to the side of my conservatory.

The dances and postures of the Satin Bower-bird (*Ptilorhynchus violaceus*) are always accompanied by a continuous song, like water escaping down a sink or gully; even the checks, occasioned by bits of leaf or stick in the water, are admirably rendered. At intervals, when the bird takes a lateral hop, or changes its position, the gurgling and sizzling notes are interrupted by hoarse screaming whistles. The postures are a good deal varied; a common type is represented by the neck being somewhat retracted, the feathers of the nape and back raised, the tail span-roofed, drooped, the wings lifted alternately, whilst the bird sways from side to side. In another dance the head is stretched forward, the body held high, with all the feathers tightly appressed, but the tail still drooping. A third position is represented by the bird gazing fixedly at its mate, with the bill nearly touching the earth; the bird often carries a feather, dead leaf, or piece of food in its mouth when going through its performance, and its changes of form and posture are quick and startling.

One thing has astonished me somewhat with regard to this species: I find that both sexes, at different times, indulge in the same performances, both in dancing and singing, and whichever sex happens to be going through its evolutions is a source of terror to the other. As both my birds acquired their very dissimilar adult colouring in September, 1900, there can be no question as to their being genuine male and female.

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Touching this acquirement of the colouring which has given to this Bower-bird its very appropriate name, a most astounding statement has been made by the Director of the Zoological Gardens at Melbourne. He asserts "that the birds only come to their full plumage in old age," and that "they die off shortly after the change."* Such an idea is contrary to all our experience of bird-life, and is certainly disproved in the case of those males of the Satin Bower-bird which have assumed their full colouring in England.

In the true Finches (*Fringillidæ*), the methods of subduing the females are very varied; the Chaffinches and Saffron-Finches (*Fringilla* and *Sycalis*) are very rough wooers; they sing vociferously, and chase their hens violently, knocking them over in their flight, pursuing and savagely pecking them even on the ground; but when once the hens become submissive, the males change their tactics, and become for the time model husbands, feeding their wives from the crop, after the fashion of the Serins, and assisting in rearing the young.

Although the hens of Saffron-Finches (*Sycalis flaveola* and *pelzelni*) frequently pursue and peck unpaired cock birds, I do not think they ever kill them, as one cock will often kill another, by tearing back the scalp from the base of the beak; but I have known a cock *S. flaveola* to kill his wife, who had already brought up two families, because she was disinclined to continue her labours.

The Serins (*Serinus*) seem to depend chiefly upon their song to captivate their brides; there is often a little chasing and quarrelling on both sides, if the hen is not inclined to undertake marital duties; as soon as she is, she sits upon a perch quivering or flapping her wings, and with her head thrown backwards. You may notice the same thing with Sparrows and many other Finches after they have once paired; but the cock Sparrows have a regular dance, with drooped wings and erected tail, which I have observed in no other *Fringillidæ*, though there may be other typical Finches which dance to their mates.

The Buntings chase their partners violently, singing all the while, after the manner of the Saffron-Finches, but without the same spite; and on more than one occasion I have had males of

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* A. T. Campbell's 'Nests and Eggs of Australian Birds,' p. 192, footnote.

Paroaria which, when courting, plucked their breasts nearly bare of feathers; whether this was to show their bravery, or to offer building materials for the new home, I never could determine; it certainly did not render them more attractive to me, however it may have struck the hen Cardinals.

Among the Weaving-Finches (*Ploceidæ*) dancing is common, and the attitudes assumed by some of the species when singing and dancing to their mates are very ludicrous. The genera of *Ploceidæ*, if judged by their habits and songs, are strangely commingled in systematic works; but to the aviculturist they readily sort themselves into the groups known as Waxbills, of which *Estrilda* is the typical genus; Grass-Finches (= *Amadina*), and many others; Mannikins, of which *Munia* is typical; Whydahs = *Vidua* and allies; and true Weavers—*Ploceus*, *Pyromelana*, &c. The true Waxbills, when showing off and singing, usually take a long grass-stem in their beaks, grasp the perch firmly, look straight upwards, and raise themselves jerkily up and down, uttering a shrill chirp, and finishing with a short song. The Grass-Finches depress the beak when dancing, and frequently sway from side to side; many of them also hold a long grass-stem in their beaks; some sing clearly, others almost inaudibly, uttering a weak sibilant song.

The Mannikins behave much like the Grass-Finches, but their tails are spread out fanwise, and they hop sideways, turning from right to left as they approach the hen; their songs are sometimes clear, but more frequently are a mere weak vibrant humming, with a few creaky notes, and a final prolonged reedy whistle. The Whydahs court hovering, rising and falling with loud beatings of the wings above the perched hen. The action of these birds reminds one forcibly of that of gnats sporting in a swarm; it is extremely graceful. The song, which is harsh and unpleasant, seems to be chiefly used as a war-cry. By its habits the little Ultramarine Finch (*Hypochera*) is undoubtedly a Whydah with short upper tail-coverts, and is, in my opinion, related to *Vidua hypocherina*. The typical Weavers, although belonging to two groups, separated by scientists under the subfamilies *Ploceinæ* and *Viduinæ*, have many peculiarities in common. They depend greatly upon their brilliant plumage, and the expansion of their crests, ruffs, and flank-plumes for attraction in their courtship; they nevertheless sing their harsh songs when making this display. The species of *Pyromelœna*, when singing, draw back the head, erect the feathers of the crown, nape, back, rump, upper tail-coverts, and flanks; indeed, all the feathers on the body seem to be partly erected, greatly adding to the apparent size and beauty of the birds. After the song, having the feathers still extended, they chase the hens with a curious mechanical buzzing flight, such as I have noticed in no other birds.

Among the Starling-like birds, I have been able to make very few observations; but I believe the Meadow-Starlings show off to their hens upon the wing, flying over, and singing to them. Thus the Red-breasted Marsh-bird (*Leistes superciliosus*), and the Military Troopials (*Trupialis militaris* and *T. defilippii*), are able to exhibit the gorgeous crimson of their under parts, which, when they crouch upon the earth, is almost completely hidden.

I have never kept pairs of any of the Crows; therefore cannot speak from experience of their courtship; but this is true also of many other groups. Parrots and Doves make friends with their mates by feeding and caressing them, but the different groups of Doves have various ways of showing off; the *Columbidæ* bowing very low, with erected expanded tail and drooped wings; then, lifting the head high, and throwing out the chest, they coo simultaneously. The *Peristeridæ* do much the same thing, the tail opening and shutting like a fan.

The Bar-shouldered Dove (*Geopelia humeralis*) at first bows to his hen, as already described; but, if she ignores his attentions, he turns his back upon her, raises his head high, spreads his tail downwards so that it sweeps the earth, runs forward with an angry little guttural sound, and looks back at her over his shoulder. If, after doing this about a dozen times, she still takes no notice, he rushes at her in a fury, and commences plucking feathers from her neck and back. The other species of *Geopelia* (*Columbula picui* and *Chamæpelia passerina*) show off in the usual manner; I have not seen them assume the second offended attitude adopted by *G. humeralis*.

I have never had a hen of the Cape Dove, and the cocks, when by themselves, are singularly apathetic; so that I have not been able to note the behaviour of this singular looking bird;

but the Australian Green-winged Dove (*Chalcophaps chrysochlora*), the Bronze-winged Pigeon (*Phaps chalcoptera*), and the Australian Crested Pigeon (*Ocyphaps lophotes*) raise their wings over their backs in front of the erected and spread tail; as they bow, both tail and flight feathers open and shut, whilst with every action the birds utter a rapid grunting monosyllabic coo. The hen Bronze-wing often mounts the cock bird when pairing, and I supposed at first that this was owing to my male being rather old and afflicted with gouty toes; but my friend Mr. Seth-Smith tells me that he has seen his birds behave in the same manner.

Wells's Ground-Dove (*Leptoptila wellsi*) behaves exactly in the same way as the *Peristeridæ*, and pairs freely with the Martinican Dove, taking turns with it in sitting on the eggs, but up to July of this year without result, the eggs not being fertile.

The Bleeding-heart Pigeon (*Phlogœnas luzonica*) rarely bows to its hen, although I have seen it do so; it usually races after her at full speed, its head bobbing forwards at each step. As it nears her it stops, depresses its tail, throws out its breast, draws back its head, and utters a smothered coo, rocking backwards and forwards on its feet; it thus exhibits the beautiful deep crimson-and-rose patch on the breast to perfection. I have also seen it stop suddenly, quiver its wings, and utter a rapid "gu-gu-gu-gu-gu-gu." When the hen Bleeding-heart persistently evades its pursuer, he eventually loses his temper; and then a new feature is introduced into his wooing. As he still chases her, he claps his wings over his back, making a sharp noise like the loud crack of a whip; this seems greatly to alarm the hen. I have wondered whether a similar sound produced by our Goatsucker is intended to subdue its mate.

The Nicobar Pigeon (*Calœnas nicobarica*) is a singularly surly bird, and I have never seen him make any attempt to woo his mate. All she ever got from him was a savage blow from his powerful wing, or his almost equally powerful bill, accompanied by a deep grunt. He is a great awkward cowardly bird, more like a Guinea-fowl than a Pigeon; and, but for his brilliant colouring, I do not think many aviculturists would care to keep him.

The songs of birds are not only often overrated, but when represented in words are usually quite unrecognizable. When you come to think of it, there are very few consonants which can be whistled, and, although a singing bird can give some idea of a *t* sound, a *ch*, or a *ph* in his notes, such utterances as *tell* and *spink* are utterly beyond him. In writing down the song of a bird in words, if you wish to convey any idea of the notes to your readers, you should first whistle in imitation of the bird, and then so far as possible write down the notes.

The songs of the Thrushes are capable of endless variation. I doubt if there were ever two Song-Thrushes or two Blackbirds which whistled alike, and yet, as a rule, the songs of these birds, of the Robin, and even of that most accomplished bird, the Mocking-bird (*Mimus polyglottus*), are unmistakable. But if you hand-rear a Blackbird or Thrush, not permitting it to hear its wild song, its notes all go wrong, and either result in a miserable Gregorian chant, or something akin thereto, or to a noisy jangle of sound which is simply appalling. I once had a hand-reared Song-Thrush which had been brought up in a poultry-yard, and subsequently placed in a room where some Canaries were kept. The song was so noisy and penetrating that I gladly sold the bird to a publican, who was wild to secure it. The natural performance of the Song-Thrush is not brilliant, but cheerful and exhilarating; yet I have heard exceptionally gifted Thrushes more than once.

Unless you can place the young of any of the Thrushes where they can hear their natural song, it is a mistake to hand-rear them; my hand-reared Nightingales never sang a note. It is therefore evident that the songs of these birds are not instinctive; they are not handed down from father to son as natural gifts, but are taught as children are taught. But this does not hold true of all birds, unless we believe, as some have asserted, that certain birds learn their parent's song while yet in the egg—a notion which to me seems absurd.

I have found that hand-reared Sky-Larks, however young they may be taken from the nest, sing the wild song perfectly, although they usually add parts of the songs of other birds which they may hear; and I am inclined to believe that the true song-birds, with the exception of the Mocking-bird and one or two others, rarely learn additional notes after they have become adult. There are notable exceptions to this rule, inasmuch as an Alario Finch (*Alario alario*) which I possessed for some years entirely forgot its melodious little song, and adopted the far less pleasing song of a Norwich Canary; and my Brazilian Hangnest (*Icterus jamacaii*) has copied to perfection the almost metallic sharp cry of a Blue-bearded Jay (*Cyanocorax cyanopogon*), in addition to his own far more pleasing notes.

Certainly the adult birds which are the best mimics, and are easily taught to talk and imitate the cries of various animals, of trumpets, jews'-harps, and the like, are not to be sought among gifted songsters, but among those whose natural cries are more or less harsh and unpleasing—such as the Parrots, Crows, and Starlings. The capacity of some of the *Psittacidæ* in this respect is practically unlimited. The late Mr. J. Abrahams had a Blue-fronted Amazon which I heard sing the whole of the words of two comic songs, and then whistle the tune of a third—a feat which, I suppose, has never been surpassed even by the best instructed Grey Parrot.

If it were possible—though, unhappily, it rarely is so—the best way to record the songs of birds would be unquestionably by musical notation. My friend Mr. Charles A. Witchell has done much in this direction, but he himself is constrained to admit "that there is no instrument which will automatically reproduce the different tones of birds, and that difference of tone or of timbre is generally more important than difference in musical pitch." For this reason I think it better for anyone who has a good ear to express the songs of birds as closely as he can in words; but, unless he really has a correct appreciation of sound, it is wiser to let the songs of birds severely alone.

As with the songs, so is it with the call-notes, notes of alarm, or defiance; these are wrongly rendered in hundreds of cases, and are frequently transposed, the note of anger being spoken of as the call-note, or the reverse. These are points that need very careful testing before they are put on record; and an observant aviculturist, who has not only watched birds in their native haunts, but has had them constantly before him in moderately large aviaries, is in a better position to form a correct judgment of the meanings of these notes than the collector.

The colouring of the soft parts in birds can only be studied when the latter are either living or recently dead. The skins in collections give no idea of them, and stuffed specimens, based upon incorrect information, sometimes entirely misrepresent them. Here the aviculturist can greatly assist the cabinet naturalist or the taxidermist, if these men will accept his statements in good faith; and in this respect my late colleague, Dr. R. Bowdler Sharpe, showed a right scientific feeling, in that he was always glad of any facts I could give him respecting the colouring of the beaks, irides, naked face-patches, and feet of species in my possession.

To cite a few instances in which errors have occurred may perhaps be useful. The Spectacled Thrush (*Trochalopterum canorum*) is so called because the eye is enclosed in a lozenge-shaped ashy-grey naked patch; yet this very characteristic feature is omitted from descriptions taken from the dried skins. The colouring of the iris in the common Jay has been systematically stated to be brown in young birds, but blue in adults; whereas the young birds have the iris blue, and the adults vinous brown. The soft parts of *Icterus jamacaii* (the Brazilian Hang-nest) are thus described: "Bill black, at the base plumbeous; feet black"; the iris not being noted. In life the bill is very dark slate-coloured, the lower mandible with the basal half ashy whitish; the iris very pale amber (or transparent primrose); the eye enclosed in an elongate subpyriform bluish-ashy naked patch; feet black. The soft parts of *Acridotheres cristatellus* are not quite correctly described, for this Crested Mynah is said to have the "bill pale yellow, with the base rose-coloured; feet orange-red; iris orange-yellow"; whereas in life the bill is bone whitish, pinkish at the base; feet ochre-yellow; iris orange. The soft parts of the Passerine Dove have been variously described, and it seems possible that there may be more than one species confounded under the name of *Chamæpelia passerina.* It is admitted that local forms showing more or less vinous colouring in the plumage exist, and if these differ markedly in the colouring of the soft parts they should, in my opinion, bear different names. Baird describes the northern form as having the bill and feet yellow, the former tipped with brown; Dresser says, "beak purplish black, iris bright red, legs flesh-coloured"; whereas the specimens which I have had alive had the bill orange, tipped with dark brown; iris purple, with pale ochreous eyelid; feet pink. In the Bleeding-heart Pigeon the irides have been described as dark brown, but when closely examined they are seen to be plum-coloured.

But it is not only in the soft parts that errors have crept into scientific descriptions and illustrations. The feathers on the head are often taken liberties with. In vol. xiii. of the 'British Museum Catalogue of Birds' the artist has represented the head of the Crested Mynah (*Acridotheres cristatellus*) with a crest from the middle of the bill to the nape, whereas in life the crest begins at the outer third of the bill, and terminates on the forehead; the feathers of the crown lie perfectly flat and smooth, *nor can they be erected.** In like manner the plate in vol. xii. illustrating the species of *Paroaria* is entirely incorrect, *P. cucullata* being the only Crested Grey Cardinal, all the others, in life, having perfectly smooth heads; moreover, the Crested Cardinal has its crest far more erect in life than in the illustration. I always think it a mistake for taxidermists, when preparing skins of crested birds, to fasten back and dry the crests in an unnatural position; it must be most misleading for artists, if not for describers. I have always insisted upon having the crests of my dead birds left standing as in life.

Touching young plumages and seasonal changes of plumage, with the manner in which these changes are contrived, the aviculturist is in a position to be of great use to the systematist. The young of quite common birds are often wanting, even in the best collections of skins, or are imperfectly represented. Thus I found that my late colleague, Dr. Sharpe, was glad to have young examples of the Saffron-Finch (*Sycalis flaveola*), with the ages attached; whilst very young skins of the Zebra-Finch (*Tæniopygia castanotis*) were in great request, the description of the young having been necessarily omitted from the Catalogue for lack of material. I believe that young examples of the Gouldian Finch (*Poëphila mirabilis*) in the green and grey plumage are still in request, and I hope that any who are successful in breeding this species, and who lose the young before their change into the adult plumage, will send them promptly to the National Collection.*

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* Such errors are unavoidable when the skins of crested birds are not left as in life, but are strapped down by the taxidermist.

As regards the acquirement of the adult plumage, some tropical birds are very precocious, but others extremely dilatory. Some of the little Ploceid Finches (such as *Amadina fasciata* and *Tæniopygia castanotis*) are in full adult plumage and ready to breed when about six to eight weeks old; thus examples of the former, which left the nest in September, were breeding in October; and it is not uncommon for Zebra Finches (*T. castanotis*) to build and lay when eight weeks old. Mr. Meade-Waldo, speaking of the Chinese Quail (*Excalphatoria sinensis*), says: "They were hatched on July 23rd, and were in adult plumage by August 27th."

On the other hand, the Satin Bower-bird is known to be very slow in acquiring its adult plumage; the late Mr. Abrahams used to put the date of change at three years of age, but the Director of the Zoological Gardens, Melbourne, Mr. A. A. C. Le Souëf, says that he "caged a number (at least a dozen), . . . and it was only after the expiration of nearly eight years they began to change colour. I think four or five birds put on the beautiful blue-black plumage, and in a year or two died off. It is therefore evident that the birds only come to their full plumage in old age, and that accounts for the fact that in a flock of, say, one hundred birds, which we often used to see at Gembrook some years ago, there would be only a very few, not half a dozen, black ones among them."†

It is well known that in many species the flocks which assemble for migratory or other purposes consist wholly of birds of one sex. Two or three years ago (and again this year) the bird-market was flooded with Pekin Nightingales (*Liothrix lutea*), of which I bought three dozen examples in various conditions of plumage, hoping to secure plenty of males of that charming songster; but all proved to be hens. It is also well known that old hen birds often assume male plumage towards the end of their lives,* owing to disease of the ovary, and it is probable that birds in captivity (which certainly live longer, when properly treated, than birds at liberty) are more subject to that disease than when they are free. This would be a more probable solution of the late assumption of the blue-black plumage by Mr. Souëf's birds than the conclusion that the Satin Bower-bird only assumed its black clothes to die in. The wedding garments of birds are believed to be assumed for the subjugation of the hens, and birds do not wait until they are old before they begin to breed.

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* When I last saw the Museum series, the young plumage was unrepresented, but possibly examples may have been since received.

† A. J. Campbell, 'Nests and Eggs of Australian Birds,' p. 192, footnote.

There is no doubt that albinism in birds is due to constitutional weakness, and is a frequent result of close inbreeding. If a pair of Sparrows (*Passer domesticus*) takes up its quarters in one part of a building, or in the roof of an isolated cottage, the young, inbreeding for successive generations, are pretty certain to throw individuals with more or less white in the plumage. The White Dove (popularly known as "White Java") is known to be merely the albino form of the Collared Turtle (*Turtur risorius*), and Mr. Abrahams assured me that it could always be produced by close inbreeding from the common type. It is probable that inbreeding first produced the pied Java Sparrows, from which the Chinese, by careful selection, evolved the white variety of that species. White in the plumage of birds is frequently due to old age, and increases year by year. A Chaffinch which I had for about fifteen years acquired quite white eyelids before its death, and a Cordon-bleu (*Estrilda phœnicotis*), now in my possession, began to acquire a white wing-speculum some three or four years ago; this has now become a large white patch. A pied Chaffinch, which I once caught in the garden, became much whiter at the two succeeding moults; and a pied Blackbird sent to me a year or more ago showed an increase of white after its autumn moult; both were delicate birds, and did not live long, so that I conclude they were probably inbred.

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* I had a remarkable instance of this in the case of a Rosa's Parrakeet (*Palæornis rosa*), which was so persecuted by her own child—a powerful young hen—that I had to cage her up separately. Two years later she assumed full male plumage, and a few months afterwards died. When opened the ovary was found to have almost entirely disappeared, the only remains being two twisted knots on the right side, almost simulating small testes.

Of the assumption of the breeding plumage by certain birds without a moult, or with only a moult of such feathers as have to be replaced by decorative plumes and crests, I have written recently in the 'Avicultural Magazine,' vol. viii. pp. 132–5; therefore, I need not enter into that matter again here. Those interested in the dispute as to the possibility of a change in the colour of feathers can easily refer to this paper, and to one which I published in 'The Ibis' for 1897.

It has always seemed to me a strange thing that ornithology, probably the most advanced study in the biological series, should in one respect be at fault, namely, in the reliance which the systematic student places upon the sexing of his specimens by collectors, and his objections to any other method but dissection for ascertaining the sex. Where would the aviculturist be, if (apart from colour differences) he were unable to be sure whether a bird was male or female?

In collections one frequently sees skins which have been incorrectly sexed by collectors—the young of *Cyanospiza ciris*, showing the commencement of the scarlet under surface of the cock bird on the flanks, yet labelled female; or, perchance, such easily sexed birds as the common Linnet, with no indication as to whether they are males or females. If one points out differences in form of beak, width of skull, length of wing, width of wing-markings, or other (apparently trifling, but actually trenchant) characters, one is met by the assertion that these are all variable, and therefore unreliable. I discovered a reason for the supposed unreliability of the sexual characters some years since when comparing my male, female, and young of *Sialia sialis* (the American Blue-bird) with the beautiful series in the British Museum collection. The males of Thrushes are rather longer and more slenderly built birds than the females; they have narrower skulls, and longer and more slender bills; but, when I compared my young cock Blue-bird (which had acquired its adult plumage) with its parents, I discovered that it was shorter than its mother, had quite as broad a skull, and a distinctly broader and shorter bill. I found that this young bird was uniform in every respect with all males of the same length in the Museum series, and that this apparently variable character was therefore due to the fact that *Sialia* acquires its adult colouring before it has lost all its structurally youthful characters, the bill of the nestling bird not having been perfectly modified into the long slender form of the fully matured male.

I have written so many short articles upon the sexing of birds by external characters, that I feel it would be superfluous to go again over the whole ground. I will therefore confine myself to a few general suggestions, which may be useful as guides to the student of this subject. There may be exceptions to the general rules, because my studies have necessarily been confined to a comparatively small number of species; and, moreover, there are still many families of birds which I have not examined; so that, even if my distinctions should prove constant to all members of a family, much yet remains to be done.

So far as I have had an opportunity of testing sexual characters, I believe that among flying birds, in which the male is dominant, the primaries of the male are longer than those of the female, or, at any rate, the wing from its base to the end of the longest primary shows greater length.

In the Thrushes (*Turdidæ*), I believe it will be found to be the rule that the entire body is longer in the male, the skull and bill longer and narrower. In the *Liotriges* the adult males are rather larger than the females, with their bills slightly, but very slightly, broader. In the Bulbuls the same differences occur, but they are more pronounced. In the Tanagers I believe the culmen of the upper mandible in adult cock birds is generally more arched, but the difference is not very marked, and young males in full colour show it less clearly than old birds. However, the sexes of Tanagers generally differ somewhat in colour, even the Superb Tanager (*Calliste fastuosa*) not being difficult to sex when fully adult. The sexes of Finches differ as regards the form of their beaks according to their habits, so that no general rule can be laid down for them; the males are usually larger than the females, and have longer wings. The Crows (*Corvidæ*) have broader and stronger bills in the males than in the females. The so-called Piping Crows (*Gymnorhina*) have longer and more slender bills in the males. The males of Larks are broader in chest, are altogether larger, and have longer wings than the females. The Parrots (according to the late Mr. Abrahams) have a much more rounded blunter infero-posterior angle to the lower jaw in the males than in the females. The Doves are very difficult to sex where colour-characters are wanting, but the males usually, if not always, show a more prominent forehead than the females.

If there were no truth in these differences, it would be impossible for the aviculturist, when dealing with species in which the sexes showed no colour differences, to select pairs for breeding purposes. If we take the common Java Sparrow (*Padda oryzivora*) as an example, I may state that at various times I have picked out pairs repeatedly, both for myself and others, for breeding purposes, and hitherto have never been wrong in my selection; or, if we take the Crested Cardinal (*Paroaria cucullata*)—from five specimens which I purchased some years ago, I selected a pair, and placed them together in an aviary. Presently the cock began to sing and show off to the hen, a nest was built, and one or two eggs dropped on the floor, proving conclusively that my pairing had been correct.

It has been objected that, allowing the sexual differences in the beaks of birds to be reliable when the creatures are alive, so much shrinkage takes place after death, that the character of the beak is modified so as to be untrustworthy for comparison. This, however, is an error based upon supposition rather than experiment. The beak, being the horny sheath of a bony structure, changes its character very little; indeed, if it did it would hardly form a suitable basis for generic or specific diagnosis.

Touching the construction of nests by birds, a great deal of poetic nonsense has been written. Most nests are pleasing objects, and some are extremely artistic; but it is not true that the most elaborate nest is entirely beyond imitation by a skilled workman; indeed, I am satisfied that a Chinese artist would be able to fashion an excellent copy of the nest of a Long-tailed Tit (that most beautiful of English types) in a tithe of the time occupied by the birds. As for the cup-shaped nest, it is formed in the most rough-and-ready fashion, and its beauty is dependent largely upon the materials used in its construction. If you watch a Finch building in a bush, as I have frequently done in my aviaries, you will be astonished to discover how easily it is managed. The hen bird picks up a long piece of hay or a grassstalk by the end, flies into the bush, and hops round from twig to twig in circular fashion, so that the stem is left entangled in a circle or half-circle; then off she goes for a second; until at length there is a pile of tangled material somewhat depressed in the centre. Now she sits down, and begins turning round, tucking in ends; then off she goes again for a scrap of moss or wool, and tucks that in; then perhaps there is a little strengthening of the outer walls by tucking in ends, twisting an end of wool round a twig, and so on. The soft inner lining is formed in the most mechanical manner; the bird collects mouthful after mouthful of wool, cow-hair, feathers, or any soft material, and carries it into the nest, until the cup appears almost full; then she sits down, scratches with her feet, and turns round and round until she has moulded it with her body into a compact felted inner cup. The addition of a few horse-hairs generally completes the little structure.* All cup-shaped nests are formed much in the same manner, though some birds use sticks, thorny twigs, straws, or roots, where others use grasses; some strengthen the outer nest with muddy roots, with clay, or cow-dung, where others use wool, vegetable fibre, and spiders' web. The lining also varies, the Song-Thrush using mud or cow-dung, and moulding it with her body until it resembles the inside of half a cocoanut-shell.

There is far more art in the construction of a domed nest, and it necessarily takes the architects much longer; it is all built up bit by bit, of more or less mixed materials, if it be the nest of a Wren or a Tit; and the outside is sometimes decorated with fragments of lichen attached by means of cobweb. It is this which renders the Long-tailed Tit's nest so beautiful an object. If a soft lining is required, soft feathers are frequently used, and the bird entering the cavity, twisting and turning, pushes up with its head, and pokes the ends of the shafts into the walls.

The Weaving Finches (*Ploceidæ*), excepting when they build in holes or other convenient receptacles, have to work both industriously and cleverly before their home is ready; but only in a few instances is the labour confined to one sex, the nest being generally constructed by the males in the Fire-Weavers (*Pyromelœna*), and in the Yellow and Black African Weavers (*Hyphantornis*); by the females in the Whydahs (*Vidua* and allies); by both sexes in *Ploceus*, although the female only comes in at the finish to assist the male in forming the cup for the reception of the eggs.

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* The Chaffinch, however, frequently sticks bits of lichen all over the outside walls of her nest.

It is certainly a most interesting sight to notice how a *Hyphantornis*, with beak and claw, commences his snail-shell-shaped nest, attaching it to the wirework over the top of an aviary. He is so quick in passing an end of grass through the wire, holding it with one claw, then with his beak pulling it back through the next mesh. But the true Weavers are marvellous; they are born architects, and delight in their work as many an old lady does in knitting.

It is instructive to watch Waxbills (*Estrilda* and allies) at work—the female inside the nest, the male outside—alternately passing the end of a grass-stem backwards and forwards, until a strongly-laced, but semitransparent, globe is formed, with entrance-hole in front (but not invariably with depressed entrance-shaft leading to it). And, speaking of this netting instinct in Weavers, reminds me that among the cup-builders there is a group of very clever Weavers (*Spermophila*), whose nests are suspended between twigs, and formed of fine tough fibre. I supplied my birds with fine willow-fibre, and the delicate lace-like nests, of which unfortunately I did not preserve a specimen, were beautiful little works of art.

How does a bird learn to build the nest which is characteristic of its species, its genus, or its family? Charles Dixon asserted that the young bird remembered and copied the nest in which it was reared—that its gifts were not instinctive. On the other hand, I assert that a bird, by seeing the inside of its parents' nest, could not understand how it was formed inside, much less outside; and that experiment proves conclusively that it does not necessarily form its nest on the pattern of that in which it was reared.

Charles Dixon speaks of a Chaffinch introduced into New Zealand which built a long tapering nest, somewhat resembling that of one of the native birds of that country, as evidence of the truth of his statement. Seebohm, however, in his 'British Birds,' records the case of a Chaffinch which built a very similar nest in England, with no such pattern to guide it. On the other hand, birds which have been bred for centuries in square boxes fixed in cages, and therefore have had no opportunity, for numerous generations, of inspecting their ancestral homes, when turned loose in an aviary furnished with shrubs, frequently build in the latter nests of the same type as those formed by their wild forefathers. It would be difficult to say when the Japanese first originated the little Bengalee (a true Guinea-pig among birds), of which one ancestor—possibly the only one—was in all probability the Striated Finch (*Munia striata*). It has been bred in small cages, perhaps for a thousand years. When it is turned into an aviary, and elects to build in a bush, it forms the typical domed nest, with entrance-hole in front, characteristic of all the Mannikins. The Canary, on the other hand, invariably builds the cup-shaped nest characteristic of true Finches. I have had these nests built in my aviaries year after year by different birds, invariably reared in the ordinary London breeding-cage.

If we deny inherited memory to birds, how are we to account for the natural fear which hand-reared birds always exhibit at the sight of a Cat; they can have no personal experience of danger connected with the presence of that creature, yet all alike are terrified at the sight of it. The Canary, which has been so coddled by man that it has become stupid, and has been so constantly accustomed to the sight of Cats for many generations, that its natural dread of them has been blunted, is perhaps the only type of bird which frequently loses its life through the loss of the instinctive fear which might have saved it.

It is generally believed that because in certain groups of Weavers the male bird is accustomed to build the nest, therefore the female is unable to do so. This I disproved in the case of a pair of *Pyromelœna franciscana*, which I purchased about the year 1885, the hen of which built and nearly completed a nest, but unhappily died (as did the cock bird) before it was finished. In like manner it is supposed that the hens of the true Finches only are able to build, but in 1895 I bred Goldfinches in one of my aviaries. The first nest was entirely built by the hen, but the second nest was built entirely by the cock, before the young of the first family were ready to fly. The hen then went and inspected the second home, and, finding it comfortable, took no further notice of her young family, which were reared by their father whilst their mother incubated a second clutch of eggs. It is possible that this may be a not unusual plan among wild Finches, and it would be interesting if owners of large aviaries would look into it carefully.

Touching these Goldfinches, there was another point worthy of note in disproof of Charles Dixon's belief. Although they were wild-caught birds, they built their nests on the floor of a converted travelling Canary-cage hung upon the wires at the back of the aviary, not in a bush or on a branch, as they might have done. I have noticed the same changed habit in the case of the Grey Singing Finch (*Serinus leucopygius*). The Hartz travelling-cage is prepared by removing the perches, food-trough, and water-pot, putting in a solid floor, and pulling out two of the short uprights from one end to leave a small entrance-hole; and it struck me that the Finches may have preferred this easily defended position for their nests to the exposure of bush or branch; otherwise there seems no explanation for their change of habit. Birds undoubtedly think and reflect, or they would often be in a bad way. No doubt many of the marvellously protected nests formed by tropical birds are the result of the experimental and reflecting thoughts of the architects through many successive generations.

At the commencement of this article I spoke of the improvement of the intellect in birds when hand-reared, due to their constant association with man. This is frequently shown in the remarkable manner in which they engage naturally in games. I have had both a Pied Wagtail and a Canary (hand-reared), which, without teaching, correctly played the game of "Hide-and-seek," hiding up when we were out of the room, and, on our return, taking no notice of our calls until we had discovered the lost one, when it immediately called out like a child, and ran or flew to meet us. Our Wagtail also played a game somewhat resembling "Touch," as follows:—Three or four persons seated themselves at different parts of the dining-room table, and then the cage-door was opened. The Wagtail flew to the middle of the table, and glanced from one person to the other; then one pointed a finger. Immediately the Wagtail rushed excitedly across, and pecked the outstretched finger; then turned, and watched for some other person to do the same. Thus it rushed from one to another until it was tired of the fun, when it returned to its cage to rest. My hand-reared Jay is as playful as a puppy, and doubtless, if instructed by an experienced showman, might have been taught many tricks; but I never care to see any bird do strange things unless it does them for its own pleasure.

The notes uttered by my Wagtail would have puzzled as well as astonished a student of wild birds, so many and varied were they. The tone was changed so as clearly to express glee, anger, expostulation, pleading, fear; they were all call-notes of a kind, but most of them I never heard from a wild Wagtail. The song was very sweet and varied, more like that of the Swallow than of any other British bird.

The nidification of many foreign birds being imperfectly known, it is useful for the aviculturist not only to watch the behaviour of birds nesting in aviaries, but to save and blow infertile, addled, or deserted eggs, carefully marking them with the name of the species, and the date at which they were laid. It is true that the eggs of many imported birds are white, and differ chiefly in size, proportional dimensions, polish, &c., as, for instance, those of the Waxbills, Mannikins, Grass Finches, typical Weavers (*Ploceus*, but not *Pyromelæna*); the whole of the Doves and Parrots; yet to those who do not know them, they are of scientific interest, as representing part of the life-history of the species.

AN ACCOUNT OF THE BIRDS MET WITH DURING A SHORT STAY IN EAST FINMARK.

By N. F. Ticehurst, M.A., M.B.O.U., and
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The planning of ornithological expeditions has always been a favourite pastime with us, but it was not till the summer of 1901 that the fitting together of different people's holidays would admit of the carrying out of one of our many plans. East Finmark has always been one of our goals, and, because of the ease with which it can now be reached, we finally decided on it as the scene of our explorations. It is quite true that there are no startling discoveries to be made there; but we thought that we should certainly meet with birds we had not yet come across at their breeding quarters, and should have a very pleasant time watching them at close range, in a place where they would be presumably tamer than at home here in England. We expected to be able to study the habits of the rarer waders—*e.g.* Phalaropes, Stints, &c.—where they were in tolerable plenty, and to make the acquaintance of such rarities as the Red-throated Pipit and Arctic Willow-Warbler. We may state here at once that we were disappointed; the birds were few and far between, and of the rarer waders, &c., we saw not one. In the first place, the year was an unfortunate one; during the first and second weeks in June there was over five feet of snow along the whole of the north coast of Norway, and the weather was so bad that the mail steamers were unable to touch at many of the villages along the coast. For this reason doubtless many of the birds, which had already arrived, were driven south again, and nested further in the interior. In the second place, we wanted to get right away from human habitation, and explore new ground, so did not keep near the coast, where doubtless we should have done better, although even there the avifauna was very scanty in comparison with what it was, as described by a friend a few years ago, at a more favourable time.

The particular ground we fixed on to explore was the valley of the Maskejok, a tributary of the Tana-elv, one of the great rivers, running north into the Arctic Ocean. As the object of this paper is to give a few notes on the birds we saw, we do not propose to go into the whole journey—the poling up the river, the shooting of the rapids, the heavy and fatiguing porterages, our life under canvas, and our struggles with the mosquitoes, "the demons of the place"—but to give a short description of the country from an ornithological point of view, and then to give short notes on each of the species of birds met with.

The Maskejok joins the Tana on its western side about four miles north of Seida, where the road from Tana mouth to Vadsö crosses the river and leaves the Tana Valley. The Maskejok Valley here widens out, and the river takes a very zigzag course, running into the main stream between high sand-banks, its mouth being guarded by a sand bar, which makes it very shallow, so much so, that when the river is low, canoes drawing only three or four inches have to be hauled across by hand. For the first few miles above its mouth the river runs almost due west, turning then south-west. For the whole of its course it runs in a well-defined valley, for the most part about a mile wide, the river ranging in width from forty to sixty yards. The banks are low on one side and high on the other, varying with the windings of the river; higher up, where there are fewer bends, both banks are for the most part uniformly low. For the first few miles, as has been said above, the course is zigzag, so much so, that after poling for half an hour the canoe is only fifty yards in a bee-line from where you started; here there are alternate stretches of deep, fairly still water, and short quick shallow runs, where the bottom changes from sand to gravel. Higher up the bottom gradually becomes more rocky, and some eight miles up the rapids begin. The first or long rapid is some five kilometres of rough, rushing water, with boulders of all sizes appearing above the surface, and for the most part only a foot or two deep; at the top of this the river makes a sharp bend round into the first pool; above this there are another two kilometres of rapids to the second pool, and then comes a succession of short rapids and pools about seven in number, with two long stretches of deep, still water intervening, till the last rapid is reached, above which is the lake. About a hundred yards from where the river runs out of the lake, the Dunkratelv runs in—this is a raging torrent with one or two small pools at long intervals, and is quite impassable for boats; at the upper end of the lake the continuation of the Maskejok runs in; it also is more or less of a torrent, and very shallow, so that boats can only be got up it to the lake beyond with infinite labour, when the river is high.

In the upper pools of the river are three or four small islets, and in the lake one, all covered with very dense willow scrub four to seven feet in height; on these an occasional Fieldfare, Redwing, or Common Sandpiper was seen.

The hills on either side, rising more or less steeply from the river banks, are nowhere very high, the highest point being about nine hundred feet. Their sides, almost to their summits, are clothed with thick birch woods, which reach right to the very edge of the river, there being only a very few places along the banks which are clear of trees. Where a small stream comes in, transforming the bank into a swamp, the birches give way to willows, which form a tangled and almost impenetrable thicket six to seven feet high, hence walking up the banks of the river is a very laborious means of progression; all the gravelly points of the river are also clothed with this same scrub. The birches vary in height up to twenty or twenty-five feet, and the only other trees seen were a few small mountain ashes and the willows, though the alder is fairly common near the mouth, where also are the only clear grassy patches, which have been transformed into hay-fields around the one or two small farms. With this exception the valley is quite uninhabited, but the numerous turf huts of all ages and in all stages of decay met with along the banks, show that parties of Finns occasionally visit the river to fish it, while others further away nearer the fjeld are evidently the remains of Fjeld Lapp encampments, as the remains of Reindeer and Wolves and the shed antlers on the fjeld testify. From the south side of the lake a tolerably well-marked foot-track leads across the fjeld to Polmak, on the Tana; this is used by parties of Finns with pack-horses, who come to net the lake. That this is a fairly wild region is evidenced by the fact that during our stay there two Wolves were seen, fairly fresh Bear droppings were found near the river and on the fjeld, Reindeer spoor was seen in a wet place, so recent that the muddy water had not yet settled in the hoof marks.

The fjeld on either side above the level of the trees is quite bare, the only growth being Reindeer moss and creeping birch, with the small arctic plants and grasses. Here and there in the marshy hollows are a few scrub birches or willow, with rarely a larger patch of the same and a piece of tussocky bog. Of tarns there are very few, as a glance at the map indicates, until the region above and to the south of the lakes is reached; here the character of the fjeld changes, and from being flat or gently sloping becomes broken up into little hills and hollows, the ground becoming more bare and boulder-strewn; the hollows are occupied by small tarns, which are deep, rocky, and with boulder-strewn margins, devoid of any vegetation. A few Snow-Buntings breed among the boulders, and there are a fair number of Common Redshanks on the fjeld near, otherwise this region is practically devoid of bird life. This was disappointing, as from looking at the map this would appear to be a particularly favourable place for waders and Ducks of all kinds.

Along the river, a single pair of Ringed Plover, a few Common Sandpipers and Redshanks, Fieldfares and Redwings, with an occasional Merganser or Dipper, were practically the only birds seen.

In the woods, the only common bird was the Willow-Wren; Fieldfares, and Bramblings were fairly common, Redwings less so; White Wagtails, Blue-headed Wagtails, Meadow Pipits, and Blue-throats were seen occasionally, while the Siberian Jay, Great Grey Shrike, Osprey, and Lesser Spotted Woodpecker were each seen once or twice.

On the fjeld, the commonest and most generally distributed birds were the Lapp Bunting and Golden Plover; while the Meadow Pipit, Wheatear, Shore Lark, Whimbrel, and Redshank were locally fairly common, with here and there a single pair of Dotterel. In the willow scrub thickets the Mealy Redpoll, Redwing, Blue-throat, Lapp Bunting, and Red-throated Pipit were found, though none of them, anywhere, in any number.

Fieldfare (*Turdus pilaris*).—In the birch woods of the Maskejok Valley we now and again saw a pair or two of these birds, but we do not think we ever saw more than four nests together; from the majority of the nests the young had flown by June 25th, but we managed to get a good series of eggs, though several clutches were very hard-set, and two to three eggs in the clutch the rule; so that probably those we got were a second laying. It is a well-known fact that where the Fieldfares breed in colonies, other birds often build in or on the outskirts of the colony; and it has been thought that advantage is taken of the Fieldfares' wariness, and their loud alarm-notes serve to warn the others of any threatening danger. Now, although so far north as this, we never found more than three to four Fieldfares' nests together, and often

Nest of Fieldfare.

they were nesting singly; we found that it was generally worth while to search the neighbouring trees, &c., and by so doing we several times found a Redwing's, Brambling's, or Redpoll's nest, which we otherwise might have missed. Most often, I think, we found a Fieldfare and a Redwing breeding in company. All the nests we found were in birches, and never more than ten feet up; in fact, nearly all could be reached without climbing at all. When incubating the old bird sits very tight, and on one occasion, the nest being favourably situated, we were able to take an excellent photograph of the old bird sitting at a distance of six feet, the whole operation of putting the camera together, &c., taking place in full view of the bird, not more than ten yards away. It was not until we almost touched her that she flew off.

Redwing (*T. iliacus*).—By no means common, but generally distributed, breeding in the small swamps in the woods or near the river, and on the hills where the trees begin to merge into scrub. One nest we found was on the high fjeld, in a large patch of scrub willow; but as high as this the birds were distinctly rare. All the nests were near the ground, the highest being 2½ ft. from it, built in scrub willow on an island in the river. A favourite situation was a dead birch-stump, about six inches high, or in the fork where two or three stems of equal size sprung from the same root; while another nest was on a pile of tree-loppings, where some wood-cutters had been at work. Most of the nests contained young by June 26th, but the nest on the high fjeld had five fresh eggs on June 28th; this nest was absolutely on the ground, at the foot of a dwarf willow, and the bird was nearly trodden on by one of us before she flew off with loud chatterings. A few addled eggs were got from other nests. We found the Redwings every bit as noisy and bold when they had young as the Fieldfares, and though from their situation the nests were not quite so easy to find, by hunting where the birds made most noise they did not give much trouble. We found that the cocks stopped singing as soon as the young were hatched, and joined the hens in tending the brood, and doing their best to drive off intruders. The song of the Redwing is quite short, and consists of only a few notes; but when near enough for one to hear the softer notes, it is by no means devoid of sweetness, and personally, hearing it for the first time, we thought it almost beautiful. Certainly it is repeated with deadly monotony, and on several occasions, when trying to get to sleep in the bright light of the midnight sun, we heartily cursed an old Redwing who, from the top of a birch tree, was pouring out his song about six or eight times a minute, hour after hour, the whole night through.

Wheatear (*Saxicola œnanthe*).—The Maskejok Valley was quite unsuited to the Wheatear, being all birch forest, and even on the open fjeld these birds were quite rare; only one was seen.

Bluethroat (*Cyanecula suecica*).—Met with constantly in the marshy willow scrub in the valley, and almost every marshy bottom on the high fjeld, if it contained willow scrub, held its pair or two of Bluethroats. Its song was constantly heard, and for variety and beauty beats any other song I have yet heard. Now and then we would hear some strange new song, and would spend some time carefully stalking the singer, only to find it was our little friend the Bluethroat again. When the young are hatched the cock, like our Nightingale, stops singing, and utters a harsh churring note. Both parents feed the brood, and at this time are much bolder and less skulking than usual. The nests, we believe, are very hard to find, and certainly we have found them so in other parts of Norway; so we must consider ourselves very lucky in having found three. A fourth we spent several hours over, watching the birds going backwards and forwards with food; but owing to the dense scrub on the banks of a stream, into which they disappeared, we could never successfully watch them on. Two of our nests were found by sheer luck, the hens flying off at our feet when walking through swampy scrub. The first was a neat round nest,

Nest of Bluethroat.

built in the ground, of coarse flat grass-stems, and well concealed among grass some ten inches high; it contained six eggs about a week incubated on July 3rd. The second was built in the roots of a scrub willow, about 4 ft. high in a very wet swamp, and contained five young about a week old, and a single addled egg of a pale blue colour without any markings. The third nest we found by beating the side of a deep pit, over which we had heard the cock persistently singing; the hen flew out from a hole in the side of the pit, in which was the nest well concealed by hanging grasses; it was somewhat larger than the other two, and was made of fine grass, with a little moss outside, and in every way, except the lining, resembled a Robin's nest at home; it contained (July 9th) five eggs about a week incubated.

Willow-Wren (*Phylloscopus trochilus*).—Quite the commonest bird in the whole valley—in fact, the only bird that was really common. The cocks were heard singing from the tops of the birches both by day and night. We were always on the look-out for a new note, having constantly in mind that we might discover the Arctic Willow-Wren, but never once did we hear a note different from that of the common species; and, though we took the trouble to shoot the birds from nests we got, they proved to be the common Willow-Wren only. It was astonishing how difficult these little birds were to see in the leafy tops of the birches, and, though they might be singing all round one, it was only by standing quite still and trying to locate the song that it was possible to see the birds at all. Our first nest was placed under a rock, and consequently had no dome to it, the rock above furnishing all necessary cover. The others were all situated in the ground, as our Willow-Wrens at home build, and were warmly lined with Willow-Grouse feathers. The eggs or young were invariably six in number, and the former were thickly speckled all over with small reddish spots, being quite different to any I had previously taken. The latest clutch on July 10th were almost hatching, while young a day or two old were found on the same day. We found later that *P. borealis* has occurred in this neighbourhood, as there is a bird (a young one just able to fly) in the Tromsö Museum, though whether it was obtained in the valley or on the Tana, at the mouth of the Maskejok, the label does not state.

White Wagtail (*Motacilla alba*). — At the mouth of the river this Wagtail was fairly common about the farm-buildings and hay-fields, but up the valley only a few scattered pairs were seen. A nest was found on June 26th containing six very incubated eggs. It was situated behind a loose board inside a ruined turf-hut in thick wood some thirty yards from the river's bank. A second nest, on July 2nd, had five nearly fresh eggs, with darker and heavier markings than the first; this nest was under a rock about half-way up the river-bank, at a spot where it was some thirty feet high, and formed of gravel and sand.

Blue-headed Wagtail (*M. flava*). — This species, of the darker-headed variety without any eye-stripe, was commoner on the Maskejok than the preceding. It was, however, only present in isolated pairs, at long distances apart, by the river-bank and on the bogs. They seemed to be earlier breeders there than the White Wagtails, as every pair we saw were busily collecting mosquitoes and other insects for their young. We found them very shy, and so long as we were near they would not go to the nest. The only nest we found was empty; it was built of fine grass, and well concealed under a grass-tussock—in fact, it was the only tussock big enough to conceal a nest anywhere near, as at that particular spot there had been a forest fire, and for a mile or more in every direction there was nothing but blackened birch-stumps, and a few flowering plants which were just beginning to recover from the general devastation.

Meadow-Pipit (*Anthus pratensis*).—Not a single Pipit of any species was seen in the valley, and very few on the fjeld, where the Meadow-Pipit was almost entirely replaced by the next species. A nest found in a clearing in a wood on the far side of the fjeld on July 8th was probably of this species; it contained five well-grown young.

Red-throated Pipit (*A. cervinus*).—We were much disappointed at finding so few of these birds. On the fjeld we found them in scattered pairs along the edge of the tree limit, and in the islands of scrub in the hollows. A patch of birch and willows a square mile or so in extent would contain perhaps as many as three pairs. The cocks, often accompanied by their mates, were to be seen taking long flights, high in the air, singing all the time. They would stay in the air for quite a considerable time, and then descend swiftly in a slanting direction to settle in the lower boughs of some willow bush, where they were immediately hidden by the thick foliage, amongst which it was only by carefully following their call-notes that they could be discovered. They were distinctly wild, and would flash out of the opposite side of the bush to another farther off often before we had discovered them sitting. I fancy that most of them were feeding their young, but they gave no indication of the whereabouts of the nest, and hunt as we would in this sea of scrub, which was in places shoulder-high, we could never find one.

Brambling (*Fringilla montifringilla*). — Next to the Willow-Wren and the Fieldfare, the commonest bird in the birch woods was the Brambling. The cocks were not often seen, except when looked for carefully, as the foliage of the birches was thick enough to hide them somewhat effectually; but their persistent song, if song it can be called, was always in evidence. We spoke above of the Redwing's persistent song, but it was not a patch on the Brambling's for annoyance. A pair had their nest within thirty yards of our tents, and for the fortnight we stayed in that place that bird never ceased from uttering its rasping note for more than half an hour at a time, even after we had taken the nest! All the nests we found, except one, which was built in a tree that had partially fallen down, were situated from ten to fifteen feet from the ground, and generally in the main fork of a birch. They were all extremely neatly and prettily built of fine grass, moss, lichens, and feathers, almost felted together, and lined with white reindeer-hair, which was to be had in plenty on the fjeld, where the deer had been dropping their winter coats, or rubbing the velvet from their horns. This species had only just begun to lay by June 25th, and we got fresh eggs up till July 10th; though on July 8th we found a nest containing five well-grown young, the only nest of young we saw. The normal number of eggs would seem to be four, though some had only three, and one contained six.

Snow-Bunting (*Plectrophenax nivalis*).—At one place on the fjeld, where the top consisted of masses of tumbled boulders and small tarns, we came across a few pairs of Snow-Buntings. They were breeding amongst the boulders on the edges of the tarns. No difficulty was experienced in watching one bird to her nest, as she was busy carrying food to her young every few minutes, quite regardless of our presence. We had to remove quite a number of large boulders before coming to the nest, which was in a cranny about four feet from the surface, and contained seven well-fledged young.

Lapp Bunting (*Calcarius lapponicus*). — Without doubt this was the commonest bird on the high fjeld, where alone it was seen, and where it was generally distributed. They seemed to mostly frequent the swampy hollows, particularly where the scrub willow and birch grew, although they were frequently seen on the bare fjeld, if the ground was tussocky. The cocks were always to be seen in their handsome breeding dress, sitting about on the tussocks or scrub, or flying in the air somewhat like a Sky-Lark, repeatedly uttering their call-notes. The hens were not nearly so commonly seen, and were doubtless for the most part sitting; but, in spite of days of hunting, we never succeeded in putting one off the nest.

Mealy Redpoll (*Acanthis linaria*).—We did not see this bird in the valley, except in the woods at the lower end; possibly in the vast tracts of birch forest their presence was overlooked; but out on the fjeld we came across several scattered and isolated pairs breeding in low birch bushes about two feet from the ground. One nest, on June 28th, contained a single egg, as also did another on the following day. On visiting these two again on July 4th the first contained another fresh egg, and the second three eggs, a day or so incubated: in spite of the fact that, not knowing whether we should ever find them again, we had taken the first two eggs. The nests were all lined with Willow-Grouse feathers and willow-down. In the Tana Valley the bird was much commoner, and one of the nests being situated near a farm was lined entirely with chickens' feathers.

Shore-Lark (*Otocorys alpestris*).—The only place where we met the Shore-Lark was on the bare boulder-strewn tops of the fjeld on the south side of the valley. Here, on the highest tops only, they were in scattered pairs or family parties. On July 4th we obtained a young bird in its first plumage, perfectly feathered. It is possible that some of them were sitting for a second time, but prolonged searching and watching failed to discover a nest.

Dipper (*Cinclus melanogaster*).— A pair were seen on June 26th, about half-way up the long rapid, and a single bird higher up on July 4th. There was a nest in rather a curious situation at one of the upper pools; it was built on the end of a birch-bough overhanging the river, and, owing to the length and thinness of the bough, it was impossible to get at it except from a boat.

Lesser Spotted Woodpecker (*Dendrocopus minor*).—On June 27th, while walking through the woods not far from camp, our attention was suddenly arrested by a loud and clamorous alarm-note; on looking round we found it proceeded from a Lesser Spotted Woodpecker, with her bill full of grubs. In a minute or two she was joined by her mate, who added his voice to the chattering. A short search revealed the small round nest-hole, situated about ten feet from the ground in a decayed birch. The birds were most anxious to drive us away, and kept running up and down the naked boughs of some neighbouring dead trees, constantly uttering their loud notes. On our retiring a few yards they settled by turns just beneath the hole, and fed their young by putting their heads alone into the nest. We often saw them afterwards in the early morning collecting grubs off the dead trees right in our camp. This is the only pair of Woodpeckers we saw, although we found many old holes, and one or two quite new ones, which, however, had not been used.

Great Grey Shrike (*Lanius major*).—On June 30th, a short way above camp, an unfamiliar note was heard, something like that of our Jay; it turned out to be the "schak schak" of a very excited pair of

Shrikes, which evidently had young. A short search revealed the nest, situated at the top of a birch tree about twenty feet high; it was a large nest, composed of small twigs and fine rootlets, lined with Willow-Grouse feathers. It was much flattened out by the young, of which one that could just fly was still in the nest; while scattered in the trees close by were the other three rather stronger young birds. Under the tree in which the nest was situated we picked up several pellets, which chiefly consisted of the remains of beetles and moths. Both parents continually fed the young, bringing food from across the river about forty yards away. They were very wary, flying straight up to the young one whose turn it was with loud cries, to which the young responded, feeding him, and at once departing across the river for a further supply, the whole operation only taking a few seconds.

Magpie (*Pica rustica*).—Only seen at the mouth of the valley near the farms.

Siberian Jay (*Perisoreus infaustus*).—A family party were seen working their way up stream in the birch trees, close to the river-bank, on June 28th; not seen again.

Hooded Crow (*Corvus cornix*).—Up the valley we only saw about two pairs, though there were several down at the mouth. A pair visited our camp nearly every night, scavenging for scraps. They seemed to come up the river from some distance, and used to arrive regularly from 3 to 5 a.m. We were several times awakened by their raucous voices, and, on lifting up the lower edge of the tent, could see them within a few yards, picking about amongst the pots and pans.

Osprey (*Pandion haliaëtus*).—On June 26th an Osprey was seen circling over the river, and through the glasses the light-coloured "hackles" at the back of his head were visible, so that he was probably an old bird. A short distance further up we came across a nest in a commanding situation at the top of a dead birch, on a point at the bend of the river. It was a large nest made of sticks, with a few pieces of earth inside it; there were no indications of its having been used that year, and it was in bad repair. This nest was well known to the Finns as that of an Osprey, and they said it had been in use for many years. A second bird was seen later flying over the lake, mobbed by about a dozen Arctic Terns.

Merlin (*Falco æsalon*).—A small Hawk seen near the lakes on July 3rd was probably of this species, though it was too far off for certain determination.

Snowy Owl (*Nyctea scandiaca*).—The remains of a beautiful old bird were picked up on the fjeld on June 29th; the feathers were scattered over a wide area, and the bones had been gnawed by Foxes, but the wings and feet were left intact, and the latter we were able to preserve as trophies. It had probably been there since the previous autumn, and possibly had died of old age; for, judging by the feathers we gathered, it must have been almost spotlessly white.

Lesser White-fronted Goose (*Anser erythropus*).—There were two pairs of these Geese nesting somewhere near the river, and the two ganders were seen in the river for three days in succession. Both banks were searched diligently by all of our party at different times, and for a considerable distance above and below where they were seen, but without result; however, on July 3rd, we found the two broods of young, with all the old birds, feeding in the river under the bank. The young had been hatched only a very short time, and were easily caught. The old birds were very bold, and flew by our canoe several times, within twenty yards, when it was quite easy to make out their small size, darkly barred under parts, with the white frontal blaze, and their bright orange-yellow legs. There seemed about six young in each brood. One of these young ones was kept by one of the Finns, and reared by hand on bits of grass; it became quite tame, and throve well. One or two pairs of these Geese were seen by the side of the mountain tarns, but always flew away together when we approached, nor could we find any signs of other nests or young. Some of them were beginning to drop their primaries, a fact which was well known to the Finns, who remarked that they would now very soon be incapable of flight.

Red-breasted Merganser (*Mergus serrator*).—This was the only Duck of which we saw more than one pair in the valley. As we poled up the river we put up several pairs or single birds. At one place a bird rose out of a patch of thick willow scrub on a point of land, and on going to the spot we found the nest, which contained nine eggs in an advanced stage of incubation. After blowing them we handed over the remains to the Finns, who boiled them, and ate the bits on bread with great gusto!

Long-tailed Duck (*Harelda glacialis*).—On walking up to a small tarn on July 1st a pair of Long-tailed Ducks flew up and settled on the water. We immediately hid ourselves and watched, but they only fed, and then went to sleep, taking not the slightest notice of us. The hen had probably been brought off to feed by the drake from the nest some distance away, as a prolonged search round the tarn failed to reveal any trace of a nest. We did not see the birds on revisiting the place some days later, and these were the only Long-tails we saw.

Common Scoter (*Œdemia nigra*).—A pair of these Ducks were flying over the lake when we first arrived, quacking and somewhat excited. We made sure that they had a nest on the island, but were unable to find it either there or round the margin of the lake. We did not see them there again. A single drake flew down the river past our camp one evening.

Wigeon (*Mareca penelope*).—On one or two occasions we saw a single Wigeon in the river, and on July 3rd we found near the same place the Duck swimming with her brood of about eight young. We never saw them again.

Common Teal (*Querquedula crecca*). — One was seen by a pool near the river, and a feather, probably belonging to a bird of this species, was picked up near another tarn.

Willow-Grouse (*Lagopus albus*). — Considering how hard these birds are to put up without a dog, and that at this time of year they were solitary or in pairs, there must have been a very fair sprinkling of them both in the woods and in the scrub on the fjeld. Hardly a day passed without we put up one or more in the course of our rambles. Two nests of seven and ten eggs respectively were brought in by the Finns, and we came across a nest of eleven eggs on July 1st. It was simply a hollow scratched out of the dead leaves under a fallen birch, and the hen ran off on our approach with dropping wings and excited cluckings; she ran along in front of us for some distance, and could not be made to fly. All the eggs were considerably incubated.

Dotterel (*Eudromias morinellus*).—We came across in all about four pairs of these delightful little birds, scattered in single pairs over a vast expanse of fjeld. One pair which we saw several times at about the same place possibly had young, though they never took much notice of us, and ran about or went to sleep on one leg quite unconcernedly within a few yards of us. Having found one of these birds that is certainly nesting, there is no bird of this group whose nest is easier to find. This was illustrated very well by the first nest we found. On June 26th, while walking over the fjeld, we topped a small rise, and immediately caught sight of a Dotterel running, with drooping wings and head straight out in front, directly away from us at about twenty yards distance. A short search failing to reveal the nest, we retired below the rise again, and almost immediately saw the bird fly back to the point where we had first seen her; giving her five minutes to settle down, we walked towards the place; she at once ran off as before, but this time, being able to mark the spot more accurately, we were able to find the nest without any difficulty. It was a mere depression in the reindeer-moss, and contained three partially incubated eggs; they were of the light stone-coloured variety, with bold markings of dark brown. While so easy to find by marking the bird, the nest would be next to impossible to discover by merely searching the ground, so well do the eggs harmonise with the moss and dead leaves. We must therefore be accounted specially fortunate in finding another nest, which we did on July 8th, while walking over the fjeld; one of us nearly trod on the eggs before seeing them. There did not appear to be any bird about, though probably she had only just run off, as the eggs were on the point of hatching. These eggs were of the same type as the first.

Ringed Plover (*Ægialitis hiaticula*).—One pair were seen, and were probably breeding, on a shingly point in one of the lower reaches of the river. We did not stop to look for the nest, as we were then poling up stream, and were disinclined to waste time over nests we did not want. They were the only pair seen in the valley.

Golden Plover (*Charadrius pluvialis*).—Fairly common all over the fjeld, and nearly all of them had young. We found them most difficult birds to watch, except from quite a short distance, so well did their plumage match the yellows and greys of the reindeer-moss. Often, when we heard one whistling, it was only by catching a momentary glimpse of the white stripe along the side of the black breast that we could find the bird at all. They were a great nuisance to us on the fjeld, as they seemed to think our only object in coming up there was to find their young; they would fly all round us, and then settle on a tussock, piping the whole time, and each pair seemed to escort us a mile or more, until it could hand us over to the attentions of its neighbours. Several times flocks of six or eight were seen, and were possibly non-breeders, as they did not seem to affect any particular tract of country, though all were in full plumage. On July 4th we found a nest of four eggs, all on the point of hatching. The behaviour of this bird was very different to that of any of the others, rising straight off the nest about thirty yards in front of us; she flew low and perfectly silently for about three hundred yards, and then settled on a tussock and commenced piping. On July 8th we found a young one about three days old; we caught sight of it first running on the bare moss, and on this occasion the old birds behaved in a precisely similar way to all the others.

Snipe (*Gallinago* sp. ?).—One was seen on June 28th. It was drumming over a marsh on the fjeld a long way off.

Common Sandpiper (*Totanus hypoleucus*).—There were several pairs of these birds nesting at intervals along the banks of the river the whole way up. A nest of three eggs was found by one of the Finns under a willow bush on June 28th, but on our return to camp we found that he had boiled and eaten them, hard-set as they were!

Redshank (*T. calidris*).—There were several pairs of Redshanks on the upper reaches of the river, and also on some of the marshes on the fjeld, both to the north and south. They all, by their actions, had young, but we did not trouble to search for them.

Greenshank (*T. canescens*).— We saw altogether three pairs of Greenshanks in the valley, all near the lower end. Two pairs were together in a very wet marsh in the woods, and the third pair in a similar place, about a mile distant from the others. Of all the waders, except perhaps the Wood-Sandpiper, the Greenshank is the noisiest and most restless. All these pairs probably had young, and seemed to spend their whole time either flying round or sitting on the tops of dead birches, whistling and chattering continuously. When we were near they all joined in mobbing us; when we hid up they mobbed every passing Magpie or Crow, and, when there was no Magpie or Crow, each pair seemed to be mobbing the other. The young must have been squatting somewhere in the tussocks of the marsh, or in the wood near; but in the thick wood that surrounded the marsh on every side, it was impossible to keep the birds under observation for more than a few minutes at a time; while the mosquitoes that accompanied us in a grey cloud wherever we went immediately got to work in thousands directly we sat down, and made bird-watching an almost unbearable torture.

Whimbrel (*Numenius phæopus*).—On several occasions, when on the fjeld, a flock of six or eight Whimbrels flew up from a long distance off, and settled near us, feeding as often on the dry moss as in a wet place. Only once did we come across a single bird, and that was on July 3rd; she rose a good distance in front, but flew away silently and low, and settled some way off. Thinking she had risen from the nest, we marked the spot, and hid up behind some rocks about two hundred yards away; she was soon joined by her mate, who flew up, whistling loudly, from some distance off. Keeping our glasses constantly on her, we saw her run about for a long time, and then fly back to the place from which she rose first, but settled some way off, and then ran to the top of a ridge, where she stood for a quarter of an hour, with her neck stretched up to its fullest extent, keeping a careful watch for any signs of danger. When she had finally satisfied herself that all was right, she ran straight down the ridge towards us, and, much to our delight, we saw her settle down on the moss in almost the exact spot that we thought she had originally risen from. On rising, we had hardly taken two steps before she was off again, flying away exactly as she had done at first. The nest was merely a scrape in the reindeer-moss, about a dozen yards from a small pool of water. The three eggs were about half-incubated, and rather more distinctly marked than the usual type, with very little of the cloudy suffused markings.

Red-throated Diver (*Colymbus septentrionalis*).—On two occasions a pair of these birds were seen fishing in one of the upper pools of the river, and once a pair—probably the same—were seen on a tarn about a mile from the same place. There were no signs of a nest round the margin, and no Divers were seen on the lake or in any of the fjeld tarns.

Skua (*Stercorarius parasiticus ?*).—One night on the fjeld two birds were seen flying some way off, which, through the glasses, were certainly Skuas, and, as their tails were noticeably long, they were possibly Buffon's Skuas.

Arctic Tern (*Sterna macrura*).—Every time we were on the lake we saw eight or ten Arctic Terns; they were always flying rather high up, and on one occasion they were mobbing an Osprey. They were possibly breeding on one of the further lakes, but, owing to the great difficulty of getting the canoes up the intervening streams, we never succeeded in penetrating so far.

Although the results of our small expedition were nothing out of the ordinary, and somewhat disappointing, the open life in a high latitude, and in the vast solitudes of forest and fjeld, was, with all its drawbacks—and those not inconsiderable ones of mosquitoes and other insect-pests—quite enjoyable, and one can look back at it now, far from its humming throng, as a delightful experience. It is possible that anyone enjoying a better season, and penetrating farther into the wilds than we did, would do much better. Two pieces of advice we would offer to anyone thinking of doing so: go prepared with plenty of "bug-juice," and with your minds made up for a perpetual mosquito war; and, secondly, take your canoes up lightly loaded, sending most of your equipment over the fjeld to the lake by pack-horses, and thus avoid many wearisome porterages.

NOTES AND QUERIES.

AVES.

Grasshopper-Warbler (Locustella nævia) near Laine, Co. Antrim.—On May 23rd, 1902, while walking up the Keelyglen Burn, my attention was called to the unmistakable notes of a Grasshopper-Warbler; it seemed to be close to the river among some thick bushes, but on approaching closer I discovered the bird sitting on the top of a furze-bush among a thick tangle of brambles. I got very close to it, and lay down, when it started its peculiar song, and kept moving its head backwards and forwards. I watched it for a long time, during which it sang at intervals; the duration of each song, I should say, was fully thirty seconds. When I rose it dropped down amongst the brambles, and skulked away. On May 24th I spent over an hour watching and listening to the Grasshopper-Warbler at Keelyglen. I had a good opportunity of viewing it through glasses, although the wind was strong, and it did not sing from the topmost branches, but always kept a little lower down. I easily made out its spotted back and breast, and peculiar shaped tail, and could follow the quick movement of the beak and turning of the head to perfection. When alarmed it flew to another clump of brambles, and after a short interval started its ruling song again; I timed one—I think a short one—as it only lasted twenty-five seconds, the one previous being longer. Thompson says: "It is probably a regular summer visitant to suitable localities from north to south." I expect, from the peculiar skulking habits of the bird, and from the want of observers, it is overlooked in this locality.—W. C. Wright (Charlevoix, Marlborough Park, Belfast).

Holboell's Redpoll in Ireland.—In November, 1894, an immature female of this large—and, in my judgment, easily distinguishable—species was shot on Achill Island, Ireland, and is now in the Baylis collection. This is, I believe, the first instance on record of the occurrence of *Cannabina holboelli* in Ireland. This specimen, which has been certified by Dr. Bowdler Sharpe, was exhibited by me at the meeting of the British Ornithologists' Club, October, 1901.—F. Coburn (Holloway Head, Birmingham).

The Jay (Garrulus glandarius) in London.—On the 17th June I saw two Jays in a garden in West Kensington. My house is in a road which forms one side of a quadrangle with three other roads. All the houses in this quadrangle are back to back, and each house has a small walled-in garden, with trees in most of them. On the morning of the above date I was seated reading at the window overlooking the garden, when my attention was attracted by seeing two largish birds fly into a tree in the garden of the next house, and immediately afterwards I heard and recognized the harsh alarm-note of the Jay. Going into the balcony, and looking carefully, I made out the two birds. They were Jays. They were moving about restlessly in the tree, and more than once uttered their loud harsh call. I should think I had them under observation for three or four minutes, when first one, then the other rose and flew over the houses, taking a south-westerly direction. It seems to me strange that so very shy a bird as a Jay should be found alighting in a London garden. What wild Jays—for these looked like wild birds, and not escaped prisoners—were doing in the vicinity of London and bricks and mortar puzzles me.—C. T. Bingham (West Kensington).

Eggs of the Cuckoo in Nests of the Hawfinch.—On an evening near the end of May, while engaged in a natural history ramble, a set of eggs were shown to me by a youth. They were a clutch of five eggs of the Hawfinch (*Coccothraustes vulgaris*), with the egg of a Cuckoo *Cuculus canorus*). As I had never previously found this combination, I was somewhat dubious as to its genuineness; but, after a few questions had been asked and answered in a straightforward way, I felt assured on the point, and determined to make a careful and systematic search in the neighbourhood. The result of this was that within a radius of half a mile from the spot two other sets of eggs of the Hawfinch, each with a Cuckoo's egg, were discovered, and a few days later another was found. The Cuckoo eggs were all after the same type, and closely resembled each other in size and colour, and the nests in which they were found were all placed in very similar situations. In quoting this occurrence, may I state that during an experience of upwards of thirty years' active field-work, in the study of ornithology, I have never before found a Cuckoo choosing the Hawfinch as foster-parent for its young.—John Palmer (Ludlow).

Moor-hen breeding in a Rook's Nest.—At a large rookery near here some of the Rooks have again built in the tall Portugal laurels. Just before Rook-shooting commenced, I visited the spot in company with Mr. Michael J. Nicoll. We counted no fewer than seven nests in the laurels, but, so far as could be gathered from appearances, in only two of the nests—placed on very thin boughs—had the birds been fortunate enough to rear their young; that nuisance—the irrepressible boy—had been at work, and, though the rookery is close to the house, and strictly protected by the owner, the nests, except in the two cases above mentioned, had been robbed. One of the nests was placed very low down—certainly not more than about ten or twelve feet from the ground—and in this a Moor-hen (*Gallinula chloropus*) had evidently brought up her brood; a dead young one was on the edge of the nest, and several pieces of broken egg-shells were in the nest itself. There is a small pool of water close by, where for some years a Moor-hen has been accustomed to place her nest. Some little time ago the weeds and scrub round the pool were cleared away, and there is no doubt that in consequence of her usual nesting place being disturbed the bird availed herself of the empty, low-placed Rooks' nest, in which to lay her eggs. — THOMAS PARKIN (High Wickham, Hastings).

Grey Plover in Birmingham.—On the 3rd October, 1899, several specimens of *Squatarola helvetica* were observed within the boundaries of the city, and one procured and brought to me. This will be read with great interest in connection with Mr. J. H. Gurney's notes (Zool. 1900, p. 112) on the migratory rush of these birds to the east coast, which lasted for ten days, and covered the date of the Birmingham specimens. This is another valuable corroboration of my oft-repeated assertion that Birmingham lies in the direct line of migration of birds passing from east, to west, or south.—F. COBURN (Holloway Head, Birmingham).

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